<https://doi.org/10.1038/s41467-023-39418-0>

Tian, H., Zhang, C., Yang, W., Du, J., Chen, Y., Xiao, Z., Mitchell, R. N., Hui, H., Changela, H., Zhang, T., Tang, X., Zhang, D., Ye, L., Li, X., & Wu, F. (2023). Surges in volcanic activity on the Moon about two billion years ago. Nature Communications, 14(1)

The history of volcanic activity on the Moon is crucial for understanding its temperature changes over time. However, it has been difficult to accurately determine recent volcanic eruptions due to limited data. The Chang’e-5 mission has provided new insight by bringing back the youngest lunar basalts. By studying 42 olivine and pyroxene crystals from these basalts, researchers have found that most of them show signs of limited magma recharge or shallow-level assimilation. The olivine grains also indicate a rapid cooling process. Thermal modeling suggests that there was a significant increase in volcanic activity around 2 billion years ago, challenging previous beliefs that lunar volcanic activity decreased over time. This discovery could change our understanding of the Moon's thermal evolution.

This research able to help for another scientist to understand how Moon was appear and developed. Also, it can help increase our level of understanding which process was in space along time ago.

This research interesting for me because it is really cool that scientists can find some minerals in other space bodies and get answer what was happened two billion years ago. Science is amazing!!

<https://doi.org/10.1038/s41586-023-06469-8>

Koch, J., Menon, K., Cuestas, E., Barbosa, S., Lutz, E., Fogarty, T., Busch, T., & Widera, A. (2022). Making statistics work: a quantum engine in the BEC-BCS crossover. arXiv (Cornell University)

Heat engines convert thermal energy into mechanical work in both classical and quantum systems. However, quantum theory offers non-classical forms of energy that have not been utilized in cyclic engines. In a recent experiment, researchers created a quantum many-body engine using the energy difference between fermionic and bosonic ensembles of ultracold particles, based on the Pauli exclusion principle. They used a harmonically trapped superfluid gas of 6Li atoms near a magnetic Feshbach resonance to change the quantum statistics from Bose–Einstein to Fermi–Dirac. The resulting Pauli engine produced a work output of several 106 vibrational quanta per cycle with an efficiency of up to 25%. This demonstrates the potential of quantum statistics as a valuable resource for work production.

This research can help for other scientist to make a quantum engine and learn some the subtleties. The article is the example of development at the cutting edge of technology.

I noticed this article because it has the really interesting title. And also after reading I was surprised because I don’t suggest that scientists one step away new revolution of technology.

<https://doi.org/10.1051/0004-6361/202038125>

Olsen, K., Lefèvre, F., Montmessin, F., Trokhimovskiy, A., Baggio, L., Fedorova, A., Alday, J., Lomakin, A., Belyaev, D., Patrakeev, A., Shakun, A., & Korablev, O. (2020). First detection of ozone in the mid-infrared at Mars: implications for methane detection. Astronomy and Astrophysics, 639, A141

In a recent study, researchers detected ozone in the mid-infrared range on Mars for the first time using the ExoMars Trace Gas Orbiter. The observation was made at high northern latitudes before a global dust storm in 2018. The ozone volume mixing ratio observed was 100-200 ppbv near 20 km, consistent with past observations in the ultraviolet range. This finding has implications for the detection of methane on Mars, as the spectral signature of ozone overlaps with the spectral range of methane. The study was conducted using the Atmospheric Chemistry Suite Mid-InfaRed (MIR) channel, which has the finest spectral resolution of any remote sensing mission to Mars. This discovery may interfere with accurate measurements of methane abundance on the planet.

This research can help understand from what atmosphere of Mars consist of and it knowledge can help in future to colonize this planet.

This article interesting for me because now Mars popular planet and understanding something about its atmosphere let understand why scientist choose this planet for future launches.